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Theme maximalization through modifiers: A case of Mandarin verbal classifier *bian*

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Abstract. Maximalization strategies and their syntactic representations are at the centre of a long debate (Filip & Rothstein 2005; Filip 2008; Martínez Vera 2021; a.o.). Semantically, events can be maximalized with respect to theme, path, degree, etc., thus featuring several types of maximalization. Syntactically, maximalization has been argued to be exerted by a verb or an argument of the verb. This research offers a new observation: elements in a modifier position can also introduce maximalization. In particular, I propose that Mandarin verbal classifier *bian* is a theme-maximalizing element situated in an adjunct of VP. I further provide a compositional analysis within the framework of neo-Davidsonian event semantics. Finally, I compare *bian* with another theme-maximaling element, *diao*, and identify two distinct levels of theme maximalization.

Keywords. maximalization; theme; verbal classifier; adjunct; modifier

1. Introduction. Regarding eventualities expressed by verbs, an issue that has long been of interest concerns the presence of some terminal point (i.e., 'telos' in Garey 1957) in the semantic representation of certain classes of verbal expressions but not others. This yields one of the basic divisions among verb meanings: the telic/atelic distinction. In what sense can we consider events as complete, and how do natural languages represent such temporal delimitation of events? A general answer is that the events associated with some terminal point culminate when the terminal point is reached (Parsons 1990). Explorations continue to pursue a more specific and formal characterisation of telic events. Building on the parallel between the meanings of nominal and verbal expressions, Krifka (1989, 1992, 1998) introduces the mereological notion 'quantization' and proposes an object-event homomorphism. In brief, an incremental theme[1] with quantized reference gives rise to telicity, like *three sandwiches* in example (1), as tested by its compatibility with *in*-adverbials and incompatibility with *for*-adverbials.[2] For simplicity, telic predicates and quantized predicates can be used interchangeably (Krifka 1992).[3]

(1) Mary ate three sandwiches {in an hour/*for an hour}.

However, an issue known as the *quantization puzzle* emerges with certain predicates which, despite lacking a well-defined terminal point, are interpreted as telic when paired with strictly

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[1] The original term in Krifka (1989) is 'gradual patient', which is rephrased as 'incremental theme' in Dowty (1991).

[2] The (in)compatibility with timespan adverbials (e.g., *in an hour*) and durative adverbials (e.g., *for an hour*) is one of the most commonly used diagnostics for the telic/atelic distinction. Refer to Filip (2012) for more tests for (a)telicity in English.

[3] Strictly, quantized predicates are a subset of telic predicates, as some predicates with set terminal points cannot be quantized (e.g., *walk to the station*); see Krifka (1992) for the distinction between 'quantization' and 'telicity'.

incremental verbs (Filip 2008; Zucchi & White 2001). Consider example (2) with modified numerals and degree achievement verbs. In (2a), the nominal *at least three sandwiches* lacks an upper bound; when it composes with *eat*, interestingly, the VP *ate at least three sandwiches* is telic, as evidenced by its compatibility with *in*-adverbials. In (2b), the verb *lengthen* provides an open scale and hence is by default atelic. However, the VP is compatible with *in*-adverbials, suggesting that it is telic.

(2) a. Mary ate at least three sandwiches in an hour.

b. Mary lengthened the rope in an hour.

The *quantization puzzle* motivates a recast of telicity in terms of maximalization on events (Filip & Rothstein 2005; Filip 2008; a.o.): Adopting event semantics with lattice structures (Link 1983, 1987; Bach 1986; Krifka 1992; a.o.), a maximalization operator on events (MAX_{E}) is proposed. Essentially, it takes a partially ordered set of events as its input and picks out the unique, largest event at a given situation, thereby yielding telicity.

Telicity via maximalization on events demonstrates explanatory power. It has been observed that several strategies of introducing event maximalization are available in different languages (Beavers 2011; Martínez Vera 2021; a.o.). Events can be measured with respect to not only themes, but also paths and degrees, as (3) illustrates. This can be neatly captured by the maximalization-based account, according to which telic expressions denote maximal events with respect to a scale. The scale imposes a partial ordering on events based on the extent to which they possess a certain measurable property. In (3), themes, paths, and degrees give rise to maximalization in different dimensions by providing different types of partial ordering as the input of the maximalization operator, namely, the quantity of sandwiches, books, path segments, and the length of the rope.

(3) a. Mary ate at least three sandwiches {in/*for} three minutes. Theme

b. The earthquake shook a book off the shelf {in/*for} three minutes. Theme & Path

c. Mary lengthened the rope {in/*for} three minutes. Degree

Similarly important is to answer how the scale can be introduced syntactically. Although there have been debates on whether telicity is determined morphosyntactically (cf. Borer 2005a,b) or by the lexical semantics of verbs (Filip 2008), it is generally agreed that the locus of the maximalization operation is a verb or a verbal phrase, and that languages may parametrically differ in how to convey the ordering on events, for example, by a theme argument, a PP, or a verb itself (Zucchi & White 2001; Filip & Rothstein 2005; Filip 2008; Martínez Vera 2021; a.o.). This study offers a novel observation that, in addition to verbs and arguments, the semantics of elements inside an adjunct position in the verbal domain can also introduce maximalization, as illustrated by the verbal classifier *bian* in Mandarin Chinese.

The remainder of this paper is organised as follows. Section 2 provides a concise overview of the counting construction ⌜NUMERAL CLASSIFIER⌝ and verbal classifiers in Mandarin Chinese, with a focus on the verbal classifier *bian* and its role in maximalization. Section 3 elucidates the requirement imposed by *bian* on the theme argument of the verb. Next, a thorough analysis of the syntactic position and the nature of ⌜NUM *bian*⌝ is detailed in Section 4, followed

by my proposal of a lexical entry for *bian* and the semantic composition in Section 5. Finally, Section 6 presents a comparison between the verbal classifier *bian* and the resultative morpheme *diao* which introduces maximalization over patient/theme according to Gu (2022), and brings a nuanced perspective to the understanding of theme maximalization in the sense that themes can be affected at more than one possible levels.

2. Background: Verbal classifiers and the maximalization effect of *bian*. Unlike in English where a numeral can directly take a noun to express the counting result, counting in Mandarin Chinese is conveyed through the combination of a numeral and a classifier, henceforth referred to as ⌜NUM CL⌝. In the domain of individuals, a classifier is required to mediate between a numeral and a noun to explicitly specify a counting unit, resulting in a sequence ⌜NUM CL N⌝. Such classifiers are termed nominal classifiers, like *ge* in (4a) which identifies the individual apple as the counting unit for *three apples*. Analogously, in the domain of events, a numeral cannot be placed after a verb on its own; a verbal classifier like *bian* is employed to provide a counting unit for events. For instance, in (4b), *bian* singles out a countable instance of the reading events. Here, ⌜NUM *bian*⌝ can be roughly conceived as a *time*-adverbial like *three times* in English.

(4) a. wo chi-le san ge pingguo.
1SG eat-PERF three CL apple
'I ate three apples.'

b. wo du-le san bian Jian Ai.
1SG read-PERF three CL Jane Eyre
'I read Jane Eyre three times.'

Before delving into the maximalization effects, let me provide two pieces of background information regarding the verbal classifier *bian*.

First, in the domain of events, there are at least two levels of counting, namely, events and occasions (Cusic 1981), and *bian* targets occasions. In English, the event/occasion distinction can be diagnosed through the scopal relation of *time*-adverbials (Cusic 1981; Andrews 1983; Cinque 1999). For example, in (5) with two co-occurring *time*-adverbials, *twice* scopes over *three times*. That is, all three sentences in (5) convey the occurrence of three knocks on two occasions.

(5) Three knocking events on two occasions

a. John knocked three times on the door twice.

b. John knocked on the door three times twice.

c. Twice, John knocked on the door three times.

In Mandarin Chinese, this distinction manifests through different types of verbal classifiers (Deng 2013; Donazzan 2013; Zhang 2017; Ye & Guo 2023). A particular category of verbal classifiers like *xia* is applied to events (also referred to as the *event-internal* verbal classifiers in Zhang 2017), while the other category, represented by *bian*, targets occasions (also known as the *event-external* verbal classifiers).[4] For example, when there are two verbal classifiers *bian* and *xia* co-occurring in a sentence, the target counted by *bian* can be subdivided into the target counted

[4] Several sets of terms have been used to describe the levels of counting in the domain of events. For example, event/occasion (Cusic 1981; Larson 2004; Donazzan 2013; Deng 2013), act/event (Cinque 1999), event/group of event (Landman 2006), event-internal/external (Zhang 2017), and act.occasion (Wągiel 2024). In this paper, I adopt the original and the most commonly cited term event/occasion from Cusic (1981) and gloss the two categories of verbal classifiers as CL_{evt} and CL_{occ} in data presentation.

by *xia*, but not vice versa; compare (6a) with (6b). Since occasions are composed of events, (6) demonstrates that *bian* and *xia* are used for occasions and events, respectively.

(6) a. ta an-le liang bian anniu, mei bian an san xia.
3SG press-PERF two CL_{occ} button every CL_{occ} press three CL_{evt}
'She pressed the buttons twice, and each time she gave the buttons three taps.'
(two button-pressing occasions, each consisting of three button-pressing events)

b. *ta an-le liang xia anniu, mei xia an san bian.
3SG press-PERF two CL_{evt} button every CL_{evt} press three CL_{occ}
Intended: 'She pressed the buttons twice, and each time she gave the buttons three taps.'

Second, the verbal classifier *bian* is grammaticalized out of the verb *bian* (Liu 1959). The verb *bian* originally means 'to spread all over', signifying maximalization over its theme; see (7).

(7) e piao bian ye. [Ancient Chinese]
hungry corpse spread.all.over field
'Famine-stricken bodies are everywhere in the field.'

The maximalization effect is retained in the verbal classifier *bian*, as suggested by its compatibility with *in*-adverbials in (8a) and incompatibility with *for*-adverbials in (8b).

(8) a. ta san fenzhong nei an-le yi bian anniu. *in*-adverbials ✓
3SG three minute in press-PERF one CL_{occ} button
'She pressed the buttons once in three minutes.'

b. *ta an yi bian anniu an-le san fenzhong. *for*-adverbials ×
3SG press one CL_{occ} button press-PERF three minute
Intended: 'She has been pressing the button once for three minutes.'

Note that without numerals, *bian* itself can give rise to telicity. For instance, the predicate *an-le bian anniu* 'press-PERF CL_{occ} button' is compatible with *in*-adverbials, as (9a) illustrates, but not with *for*-adverbials, as shown by (9b).

(9) a. ta san fenzhong nei an-le bian anniu. *in*-adverbials ✓
3SG three minute in press-PERF CL_{occ} button
'She pressed the buttons once in three minutes.'

b. *ta an bian anniu_{F} an-le san fenzhong. *for*-adverbials ×
3SG press CL_{occ} button press-PERF three minute
Intended: 'She has been pressing the buttons once for three minutes.'

To further illustrate the maximalization effects associated with *bian*, I will argue that semantically, *bian* requires the theme argument to induce an ordering on events; syntactically, ⌜NUM *bian*⌝ is a VP-modifier, through which *bian* imposes the maximalization requirement on the theme argument.

3. Observation: Requirements of *bian* on the theme argument. In Mandarin, the theme argument of a verb can be encoded by a bare noun in the object position. A bare noun theme generally does not specify number or definiteness. For example, in a simple sentence containing only a subject, a verb, and an object, such as (10a), the bare noun theme *anniu* 'button' can be interpreted as singular indefinite, plural indefinite, singular definite, or plural definite. Hence, the sentence in (10a) has four possible interpretations. Compared to the baseline sentence, a sentence with ⌜NUM *bian*⌝ like (10b) has only one interpretation: There were two occasions consisting of button-pressing events conducted by 'I', such that the pressing involved all of the buttons.

(10) a. wo an-le anniu.
1SG press-PERF button
'I pressed a button.'
'I pressed some buttons.'
'I pressed the button.'
'I pressed the buttons.'

b. wo an-le liang bian anniu.
1SG press-PERF two CL_{occ} button
#'I pressed a button twice.'
#'I pressed some buttons twice.'
#'I pressed the button twice.'
'I pressed all of the buttons twice.'

Intuitively, with ⌜NUM *bian*⌝, the theme argument of the verb is obligatorily interpreted as plural, definite and maximalized. In what follows, I will tease apart such requirements of *bian* and provide evidence for each of them.

3.1. MAXIMALIZATION REQUIREMENT. The first requirement of *bian* on the theme argument is that the theme has to be maximalized. As shown by (11), (10b) cannot be followed by an additive clause. That is, the theme of the *bian*-sentence exhibits anti-additivity.

(11) wo an-le liang bian anniu, (#hai you yi ge mei an.)
1SG press-PERF two CL_{occ} button still have one CL not press
'I pressed all of the buttons twice, #and there is still a button that is not pressed.'

3.2. SUBPART REQUIREMENT. The second requirement of *bian* is that the theme must have identifiable subparts with respect to the corresponding events. Evidence for the subpart requirement comes from the compatibility of *bian* with a plural definite theme like *zhexie anniu* 'these buttons' and *zhe san ge anniu* 'these three buttons', as well as the infelicity of a singular definite theme such as *zhe yi ge anniu* 'this button' in the *bian*-sentence; see (12). What leads to this contrast is that themes like 'these buttons' and 'these three buttons' inherently have subparts with respect to a pressing event, whereas themes like 'this button' typically lack identifiable subparts with respect to a pressing event. Button-pressing events generally do not mean to press any subparts of a button. As such, in most contexts, a single button is considered lacking identifiable subparts with respect to a pressing event.

(12) wo an-le liang bian {zhexie / zhe san ge / #zhe yi ge} anniu.
1SG press-PERF two CL_{occ} these the three CL the one CL button
'I pressed {these buttons / these three buttons / #this button} twice.'

Note that subparts may vary in different contexts, but they must be identifiable with respect to the corresponding event. By manipulating the context, it is possible to make subparts of a single button – for instance, every segment of its surface – to be identifiable with respect to a particular kind of pressing event. Imagine a scenario where a button fails to function, and someone attempts to activate it by pressing from every possible angle. In such contexts, using ⌜NUM *bian*⌝ with a singular definite theme becomes acceptable, as shown by (13). Here, every segment of this single button can be viewed as identifiable subparts with respect to the pressing event.

(13) wo ba zhe ge anniu shang-xia-zuo-you dou an-le yi bian.
1SG BA this CL button up-down-left-right all press-PERF one CL_{occ}
'I pressed every part of this button once.'

It is also worth mentioning that some singular nouns inherently have identifiable subparts, which makes them compatible with *bian*. For example, in (4b), *Jane Eyre* (the book) is a singular theme argument, but it is compatible with *bian*, given that a book is composed of identifiable subparts like chapters or paragraphs with respect to a reading event.

3.3. DEFINITENESS REQUIREMENT. The third requirement is that the theme argument should be definite. As we can see from (12), restated here as (14a), *bian* allows for definite theme arguments like *zhexie anniu* 'these buttons' and *zhe san ge anniu* 'these three buttons'. However, it rejects indefinite theme arguments such as *yixie anniu* 'some buttons' and *san ge anniu* 'three buttons'; see (14b). In Section 5, I will discuss the relation between the definiteness requirement and the maximalization requirement in detail.

(14) a. wo an-le liang bian {zhexie / zhe san ge} anniu.
1SG press-PERF two CL_{occ} these the three CL button
'I pressed {these buttons / these three buttons} twice.'

b. wo an-le liang bian {#yixie / #san ge} anniu.
1SG press-PERF two CL_{occ} some three CL button
Intended: 'I pressed {some buttons / three buttons} twice.'

So far, I have demonstrated that *bian* requires the theme argument of the verb to be maximal, to have identifiable subparts, and to be definite. To derive ⌜NUM *bian*⌝ compositionally, let me first dissect the syntax of ⌜NUM *bian*⌝. Specifically, we will look at the syntactic nature and the position of ⌜NUM *bian*⌝.

4. ⌜NUM *bian*⌝ is an adjunct of VP.

4.1. SYNTACTIC NATURE. Regarding the syntactic nature of ⌜NUM *bian*⌝, I argue that ⌜NUM *bian*⌝ neither constitutes a part of the object nor stands as an argument of the verb. Moreover, it is not a manifestation of a specifier-head pair of a functional projection. Rather, ⌜NUM *bian*⌝ serves as an adjunct in the verbal domain.

4.1.1. ⌜NUM *bian*⌝ IS NOT PART OF THE OBJECT. The first thing to clarify is that although ⌜NUM *bian*⌝ precedes the object linearly, as observed in (4), it does not form a constituent with the object, as supported by the failure of *de*-insertion. In Chinese descriptive grammar, *de* is viewed as a marker of nominal modification, linking a modifier to the head it modifies (Chao 1968). Unlike ⌜NUM CL⌝ formed with a nominal classifier in (15a) which allows *de*-insertion, ⌜NUM CL⌝ formed with a verbal classifier forbids it (Huang 2008), as (15b) illustrates. This shows that ⌜NUM *bian*⌝ is not in a modification relation with the object structurally.

(15) a. wo chi-le san xiang de pingguo. nominal classifier, *de*-insertion ✓
1SG eat-PERF three CL_{box} MOD apple
'I ate three boxes of apples.'

b. *wo an-le san bian de anniu. verbal classifier, *de*-insertion ×
1SG press-PERF three CL_{occ} MOD button
Intended: 'I pressed all of the buttons three times.'

4.1.2. ⌜NUM *bian*⌝ IS NOT AN ARGUMENT OF THE VERB. Two key pieces of evidence have been presented in Guo & Ye (2023), as summarised below with slight modifications. First, ⌜NUM *bian*⌝ can compose with predicates whose argument slots are already saturated. In examples with ditransitive verbs like (16), ⌜NUM *bian*⌝ appears alongside the direct object, the indirect object, and the subject, thereby confirming that ⌜NUM *bian*⌝ does not occupy any argument position.

(16) a. ta jiao-le wo liang bian guoji yinbiao.
3SG teach-PERF 1SG two CL_{occ} international phonetic
'She taught me the Interational Phonetic Alphabet twice.'

b. ta gaosu-le wo liang bian caipai liucheng.
3SG tell-PERF 1SG two CL_{occ} rehearsal procedure
'She told me the rehearsal procedure twice.'

Second, ⌜NUM *bian*⌝ and indefinite objects do not behave alike in their scoping relation with respect to intentional verbs. Specifically, ⌜NUM *bian*⌝ lacks a *de re* reading, which indicates its adjunct status (Landman 2004, 2006).[5] An indefinite object, for example, *yi ge Beijing guniang* 'a girl from Beijing' in (17a), can take either the narrow scope or the wide scope with respect to the intensional verb *xiang* 'want'. By contrast, *yi bian* 'one time' in (17b) can only be interpreted within the scope of *xiang* 'want'.

(17) a. ta xiang qu yi ge Beijing guniang.
3SG want marry one CL Beijing girl
'He wants to marry a girl from Beijing.' *want* > 1
'There is a girl from Beijing who he wants to marry.' 1 > *want*

[5] Landman (2004, 2006) uses the lack of a *de re* reading as a test for the adjunct status of English *time*-adverbials. The exceptional scope of indefinites can be accounted for through several approaches, such as quantifier raising and choice functions. Regardless of the chosen theoretical framework, it is important to acknowledge the distinction between ⌜NUM *bian*⌝ and regular indefinite objects.

b. ta xiang an yi bian anniu.
3SG want press one CL_{occ} button
'He wants to press all of the buttons once.' *want* > 1
#'There is a time when he wants to press all of the buttons.' #1 > *want*

4.1.3. ⌜NUM *bian*⌝ IS NOT IN A SPEC-HEAD RELATION. ⌜NUM CL⌝ formed with verbal classifiers have been previously posited as two separate items – the verbal classifier is the head of a functional projection, while the numeral occupies the specifier position of this projection (Zhang 2017). In particular, occasion-counting verbal classifiers are base-generated in the head of UnitP which c-commands *v*P, as sketched in (18a). To derive the linear order 'S V NUM CL_{occ} O', Zhang (2017) assumes that with an occasion-counting verbal classifier, *v*P is obligatorily fronted to a landing site higher than UnitP after subject-raising and object-raising, as illustrated by (18b)–(18d). Interlined is the application of Zhang's (2017) analysis to *bian*, as demonstrated by the example *wo an liang bian anniu* ('I press two CL_{occ} button'):

(18) a. $[_{\text{UnitP}}\ two\ [_{\text{Unit'}}\ \text{CL}_{occ}\ [_{v\text{P}}\ I\ [_{v'}\ v\ [_{\text{VP}}\ press\ button\ ]]]]]$
liang bian wo an anniu

b. $[\ldots\ I_i\ \ldots [_{\text{UnitP}}\ two\ [_{\text{Unit'}}\ \text{CL}_{occ}\ [_{v\text{P}}\ t_i\ [_{v'}\ v\ [_{\text{VP}}\ press\ button\ ]]]]]]$
wo liang bian _ an anniu (subject-raising)

c. $[\ldots\ I\ \ldots [_{\text{UnitP}}\ two\ [_{\text{Unit'}}\ \text{CL}_{occ}\ [_{\text{XP}}\ button_j\ [_{\text{X'}}\ \text{X}\ [_{v\text{P}}\ [_{v'}\ v\ [_{\text{VP}}\ press\ t_j\ ]]]]]]]]$
wo liang bian anniu an _ (object-raising)

d. $[\ldots\ I\ \ldots [_{\text{YP}}\ [_{v\text{P}}\ \ldots\ press\ ]_k [_{\text{Y'}}\ \text{Y}\ \ldots\ [_{\text{UnitP}}\ two\ [_{\text{Unit'}}\ \text{CL}_{occ}\ [_{\text{XP}}\ button\ [_{\text{X'}}\ \text{X}\ t_k\ ]]]]]]]$
wo an liang bian anniu _
(remnant *v*P-movement)

Zhang's (2017) postulation that the numeral and *bian* are tied in a Spec-Head relation relies on some *ad hoc* assumptions. First, aside from subject-raising, Zhang (2017) hypothesises object-raising to the specifier of XP, which is driven by information structural reasons. However, whether ⌜NUM *bian*⌝ is present or not, the information status of the object seems to remain the same. Second, she assumes a remnant *v*P-movement that strictly follows object-raising, but the motivation and the landing site for this movement are yet to be spelled out. Furthermore, it appears that there is no more independent evidence for *bian* to occupy a position higher than the specifier of *v*P. In fact, I will show in Section 4.2 that ⌜NUM *bian*⌝ cannot be higher than the subject position.

Zhang (2017) also lists some non-adjunct properties of ⌜NUM CL_{occ}⌝ to support her analysis, yet the evidence is not conclusive. The first property she mentions is that ⌜NUM CL_{occ}⌝ can occur after a verb, while typical adverbs like *jingchang* 'often' cannot. However, the presence of postverbal adjuncts in Mandarin seems to be overlooked. For example, *zai zhuo shang* 'on the table' in (19a) is a locative adverbial occupying a postverbal position; the locative here is not part of the main verb, as (19b) demonstrates.

(19) a. shu jiu fang zai zhuo-shang ba.
book then put on table-top SFP
'Place the book on the table then.'

b. shu fang-mei-fang zai zhuo-shang?
book put-NEG-put on table-top
'Is the book placed on the table?'

Another piece of evidence raised in Zhang (2017) is that ⌜NUM CL_{occ}⌝ can license VP-ellipsis while adverbs like *jingchang* 'often' cannot. However, several adverbs systematically allow for VP-ellipsis, as Fang (2022) reports. For instance, *mashang* 'at once' and *ganjin* 'quickly' in (20) occur in sentences without an overt VP.

(20) Context: Speaker B has not submitted her homework, and Speaker A is rushing her.

A:	ni	jiao	zuoye	a.	B:	hao.	wo	mashang.	A: ganjin ba.
	2SG	submit	homework	SFP		sure	1SG	at.once	quickly SFP
	'You hand in the homework.'					'Sure. I will do it at once.'			'Do it quickly.'

I conclude that ⌜NUM *bian*⌝ is an adjunct, rather than a part of the object, an argument, or a Spec-Head combination of a functional projection. In the following, I will show that ⌜NUM *bian*⌝ is an adjunct of VP.

4.2. SYNTACTIC POSITION. Establishing that ⌜NUM *bian*⌝ is an adjunct in the verbal domain (Section 4.1), we now take a further look at its syntactic position. There are three possibilities, namely, the adjunct of *v*P, VP, or V, as sketched in (21). In this subsection, I will detail the findings from several diagnostic tests which serve to identify ⌜NUM *bian*⌝ as an adjunct of VP.

(21) $[_{vP}$ ADJUNCT $[_{vP}$ SBJ $[_{v'}$ *v* $[_{VP}$ ADJUNCT $[_{VP} \ldots [_{V'} [_{V}$ ADJUNCT V]] OBJ]]]]]
Possibility 1 Possibility 2 Possibility 3

4.2.1. ⌜NUM *bian*⌝ IS NOT AN ADJUNCT OF *v*P. ⌜NUM *bian*⌝ cannot be generated in a position higher than the subject position, as suggested by its interaction with unaccusative subjects. A general assumption of unaccusative verbs is that they lack an external argument – the surface subject of an unaccusative verb is a theme or a patient that originates in the object position (Perlmutter 1978; Burzio 1986; a.o.). Now, recall from Section 3 that *bian* requires the theme argument to be maximal, to have identifiable subparts, and to be definite. Based on such requirements, I assume that structurally, the target of *bian* should be situated within the scope of ⌜NUM *bian*⌝. Yet, for unaccusatives with a subject that meets the requirements of *bian*, the sentence is still ungrammatical. For example, in (22), the main verb *bing* 'fall ill' is unaccusative, and the theme *women* 'we' is definite, maximal, and has identifiable subparts with regard to the event of falling ill, but the sentence is still degraded. This demonstrates that the subject must be outside the scope of ⌜NUM *bian*⌝, namely, the subject position is not c-commanded by ⌜NUM *bian*⌝. [6]

(22) *women bing-le san bian.
1PL fall.ill-PERF three CL_{occ}
Intended: 'All of us have fallen ill three times.'

Further evidence is provided by the scoping relation between ⌜NUM *bian*⌝ and subject-oriented adverbs such as *shabulaji-de* 'stupidly', as illustrated in (23). In the presence of a subject-oriented adverb, *san bian* 'three times' takes the narrow scope, yielding only one interpretation of the sentence, i.e., the agent was stupid for conducting button-pressing events over three occasions.

[6] The ungrammaticality of (22) seems to indicate that the theme argument in the subject position cannot be reconstructed to its base-generated position. A possible explanation is that A-movement does not generally allow reconstruction (Chomsky 1995; a.o.). I leave this issue for further investigation.

(23) ta shabulaji-de an-le san bian anniu.
3SG stupid-MOD press-PERF three CL_{occ} button
'It was stupid of him to press all of the buttons three times.' stupidly > 3
#'There were three times, and for each time, it was stupid of him to press the buttons.'
*3 > stupidly

Considering that ⌜NUM *bian*⌝ is an adjunct, and given that adjuncts typically reside in the outermost layer of a given projection, it follows that ⌜NUM *bian*⌝ cannot serve as the adjunct of *v*P, nor can it occupy a position higher than *v*, contrary to Zhang's (2017) hypothesis that occasion-counting verbal classifiers are located above *v*.

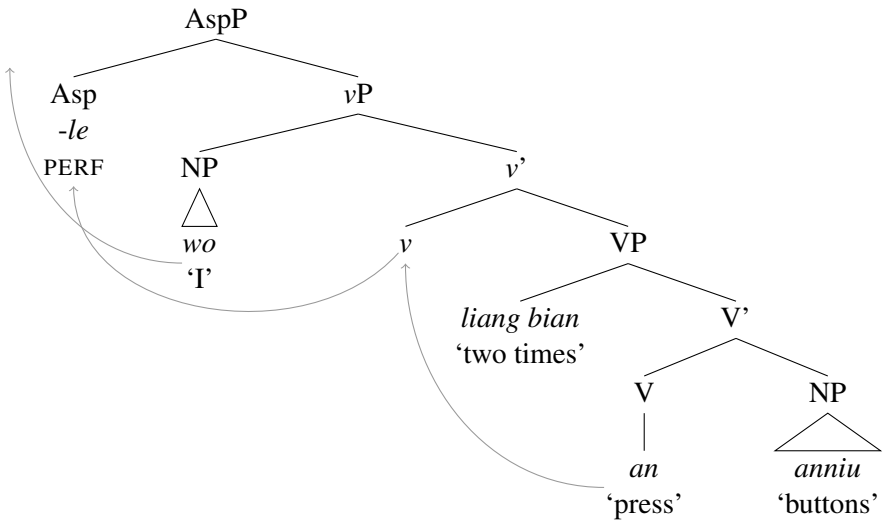
4.2.2. ⌜NUM *bian*⌝ IS NOT AN ADJUNCT OF V. As described in Section 3, ⌜NUM *bian*⌝ can occur in a sentence if the theme of the verb is maximal, definite, and has identifiable subparts with respect to the event denoted by the verb. Given such requirements, the theme argument should be located within the c-command domain of ⌜NUM *bian*⌝. Since the theme argument is typically generated in the complement of V, ⌜NUM *bian*⌝ should c-command the complement of V, which means that it should not be lower than V'.

Furthermore, ⌜NUM *bian*⌝ unequivocally scopes over object-oriented adverbials. For example, the sentence in (24) has only one reading, namely, the wide scope reading of *san bian* 'three times', expressing that the event of transporting stones from the larger ones to the smaller ones occurred across three distinct occasions. Conversely, the narrow scope reading of *san bian* 'three times' is not available, which suggests that the stones were first organised into three piles (large, medium, small) and then each pile of stones was moved separately. In this way, we can see that ⌜NUM *bian*⌝ must be structurally higher than the object position, and hence cannot be an adjunct of V.

(24) tamen cong da dao xiao ban-le san bian shitou.
3PL from large to small carry-PERF three CL_{occ} stone
'There were three times in which they carried stones, each time starting with the larger ones and progressing to the smaller ones.' 3 > from large to small
#'They carried stones in a descending order of size, across three distinct occasions: the first time, the large stones; the second time, the medium-sized stones; and the third time, the small stones.' *from large to small > 3

4.2.3. SUMMARY: ⌜NUM *bian*⌝ IS AN ADJUNCT OF VP. Among the three potential positions for ⌜NUM *bian*⌝ introduced at the start of this subsection, the possibilities of being an adjunct of *v*P (Section 4.2.1) or an adjunct of V (Section 4.2.2) have been eliminated. This leaves only one viable option: ⌜NUM *bian*⌝ must be an adjunct of VP, as illustrated by (25) based on the data in (10b). Specifically, I follow Huang, Li & Li's (2009) analysis and treat the perfective marker *-le* as an affix at the AspP head. Then, the verb moves from V through *v*, eventually landing in Asp. A simple verb movement, coupled with standard subject-raising, derives the desirable linear order.

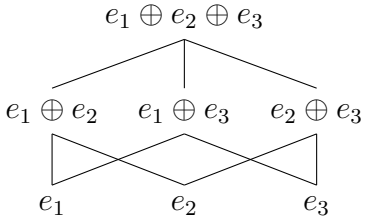
(25)



5. *bian* is a maximalizing element inside a modifier. Turning now to the semantics of ⌜V NUM *bian*⌝, I will first lay out the theoretical background and introduce my assumptions on the semantics of events, verbs, and verbal classifiers. Next, I will propose a lexical entry for *bian* and derive the three requirements on theme. Subsequently, I will give a compositional analysis and argue that *bian* and ⌜NUM *bian*⌝ are intersective modifiers rather than quantifiers.

5.1. BACKGROUND ASSUMPTIONS. Regarding the denotation of verbs, I adopt neo-Davidsonian event semantics (Parsons 1990; Carlson 1984; a.o.) and take verbs as one-place predicates of events. Verbs are combined with the thematic arguments via predicate modification, with all arguments introduced by the thematic role heads. Following the general assumption that a verb denotes a set of events (Parsons 1990; Krifka 1992; a.o.), and Krifka's (1989) idea that there is a semi-lattice structure in the domain of events, I assume that a verb denotes a structured set of events which may contain atomic events (e_1) and complex events ($e_1 \oplus e_2$), as represented by (26). Regarding the denotation of verbal classifiers, I put forth, following Ye & Guo (2023), that an event-counting verbal classifier denotes a set of events, whereas an occasion-counting verbal classifier denotes a set of groups of events, as (27) illustrates. Occasions are characterised as groups of events with the group forming operator $\uparrow$ (Link 1984; Landman 1989a,b). A group of events is an atom that contains at least one atomic event or one complex event.

(26)



(27) a. Occasion-counting verbal classifiers $\{\uparrow(e_1), \uparrow(e_2), \uparrow(e_1 \oplus e_2), \uparrow(e_1) \oplus \uparrow(e_2), \ldots\}$

b. Event-counting verbal classifiers $\{e_1, e_2, e_1 \oplus e_2, \ldots\}$

5.2. LEXICAL ENTRY FOR *bian*. In particular, I propose that the verbal classifier *bian* denotes a set of groups of events, the theme of which is the maximal one, as illustrated in (28).[7] The three

[7] This is a revised version of the analysis in Guo & Ye (2023) where the three requirements are separately encoded by *bian*.

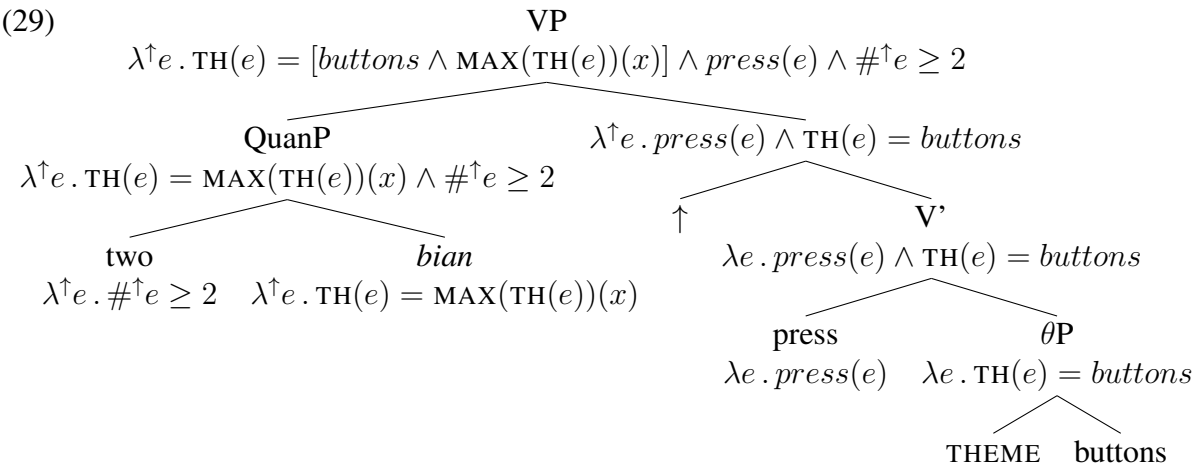
requirements of *bian* eventually boil down to theme maximalization. The **maximalization requirement** demands that every part of the theme is involved in a subevent of the corresponding event. The **subpart requirement** can be viewed as an existential presupposition of the maximalization requirement, given that if every part of the theme is a theme of a subevent, then it must be true that the theme has identifiable subparts with respect to the corresponding event. The **definite requirement** also follows from the maximalization requirement, since the theme is the unique, maximal one in the context that satisfies the requirements, i.e., the sum of all subparts.

(28) a. $[\![\textit{bian}]\!] = \lambda^{\uparrow} e \,.\, \textsc{th}(e) = \textsc{max}(\textsc{th}(e))(x)$

b. $\textsc{max}(\textsc{th}(e))(x) \stackrel{\text{def}}{=} \forall y[y \sqsubset x \rightarrow \exists e'[e' \sqsubset e \wedge \textsc{th}(e') = y]]$
(every part of x is a theme of a subevent of e)

5.3. SEMANTIC COMPOSITION. Integrating the lexical entry for *bian* with the syntactic structure proposed in Section 4, the semantic composition of the sentence in (10b) can be outlined as (29). The verb initially merges with the theme (θP), and then combines with the group forming operator $\uparrow$, yielding a set of groups of button-pressing events. On the other hand, the numeral 'two' and the verbal classifier *bian* are combined via predicate modification to form a Quantity Phrase (QuanP, cf. Borer 2005a). QuanP modifies V', resulting in a set of groups of button-pressing events whose theme is the maximal one.

(29)



Here, I analyse *bian*, as well as ⌜NUM *bian*⌝, as intersective modifiers (cf. Landman 2000, 2004). This is supported by two pieces of evidence.

First, there is no observation of quantifier raising of ⌜NUM *bian*⌝. In contrast to indefinite objects like *yi ben shu* 'a book' in (30a) which can scope over the universal subject *suoyou ren* 'everyone', ⌜NUM *bian*⌝ cannot be raised as a quantifier, and it can only get the narrow scope reading with respect to the universal subject, as in (30b).

(30) a. suoyou ren dou du-le yi ben shu.
all people all read-PERF one CL book
'Everyone read a book.' $\forall > 1$
'There is a book which everyone read.' $1 > \forall$

b. suoyou ren dou an-le yi bian anniu.
all people all press-PERF one CL_{occ} button
'Everyone pressed all of the buttons once.' $\forall > 1$
#'There is a time when everyone pressed all of the buttons.' $\#1 > \forall$

Second, in combination with other plurals, ⌜NUM *bian*⌝ has a scopeless, cumulative reading. For example, the sentence in (31) is considered true in a scenario where John pressed all of the buttons once and Mary pressed all of the buttons three times.

(31) liang ge ren an-le si bian anniu.
two CL people press-PERF four CL_{occ} button
'For all of the buttons, there is a total of four times of pressing, with two people as agents.'

To encapsulate, ⌜NUM *bian*⌝ is an intersective modifier rather than a quantifier. It is worth mentioning that although ⌜NUM *bian*⌝ is not a quantifier, the group forming operator $\uparrow$ associated with it can be a scope taker. This is the reason why ⌜NUM *bian*⌝ is observed to scope below the subject (23) and above the object (24), as shown in Section 4.

6. Comparison with *diao*. All in all, *bian* is a verbal classifier inside an adjunct of VP that requires the theme to be maximal. In the end, I will compare *bian* with the resultative morpheme *diao* which, according to Gu (2022), exhibits theme maximalization as well.

A diagnostic test for theme maximalization that applies to both *diao* and *bian* is anti-additivity. For example, neither a sentence with *diao* nor a sentence with *bian* can be followed by an additive clause, as (32) demonstrates.

(32) a. ta he-diao-le zhuo-shang-de yinliao, (#hai sheng-le yi ping.)
he drink-CULM-PERF table-top-MOD beverage still leave-PERF one CL
'He drank up the beverages on the table, #and there was one still left behind.'

b. ta he-le yi bian zhuo-shang-de yinliao, (#hai sheng-le yi ping).
he drink-PERF one CL_{occ} table-top-MOD beverage still leave-PERF one CL
'He drank from all of the beverages on the table once, #and there was one still left behind.'

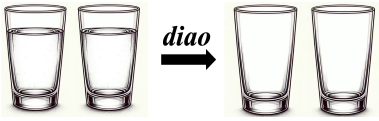
However, theme maximalization of *diao* and that of *bian* actually target two distinct levels. This can be seen from their difference in completion entailment, as shown by (33). The sentence with *diao* requires the theme to be affected entirely, which conflicts with a clause that delivers an unfinished meaning, as in (33a). Contrastively, the sentence with *bian* does not necessarily demand completion – in fact, (33b) can express that the agent took a couple of sips from each of the beverages on the table, but he did not finish all of them.

(33) a. ta he-diao-le zhuo-shang-de yinliao, (#dan mei he-wan).
he drink-CULM-PERF table-top-MOD beverage but not drink-TERM
'He drank up the beverages on the table, #but he did not finish all of them.'

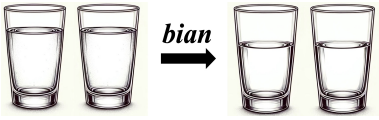
b. ta he-le yi bian zhuo-shang-de yinliao, (dan mei he-wan).
he drink-PERF one CL_{occ} table-top-MOD beverage but not drink-TERM
'He drank from all of the beverages on the table once, but he did not finish all of them.'

To capture the contrast between *bian* and *diao* in (33), I propose that there are two distinct levels where the theme can be affected. Specifically, *diao* involves every part of the theme, and requires each subevent to be complete. That is to say, the theme is affected entirely, as shown by (34a). Therefore, the sentence with *diao* in (33a) cannot be followed by a clause that indicates incompleteness of subevents. By contrast, although *bian* also involves every part of the theme, it does not require each subevent to be complete, as (34b) illustrates. This is why the sentence with *bian* in (33b) is compatible with a clause that indicates incompleteness of subevents.

(34) a. *diao*: two complete drinking events, two beverages



b. *bian*: two drinking events, two beverages



In other words, both the sentence with *diao* and the sentence with *bian* involve every part of the theme (i.e., two beverages). The difference lies in the completeness of subevents – *diao* requires each drinking to be complete, namely, all of the beverages must have been consumed, while *bian* does not have such a requirement. As far as I can see, Gu's (2022) analysis of *diao* only captures theme maximalization, but cannot guarantee the completeness of each subevent.

7. Conclusion. This paper presents a thorough investigation of the theme maximalization effects exerted by the verbal classifier *bian* in Mandarin Chinese. I show that an element from a modifier in an adjunct position can impose maximalization-related requirements on the theme of the verb, and propose a lexical entry for *bian* which can account for all of the observed requirements. The comparison between two theme-maximalizing elements in Mandarin, viz. *bian* and *diao*, helps to understand theme maximalization at two distinct levels: the involvement of every part of the theme, and the completion of every subevent.

References

Andrews, Avery. 1983. A note on the constituent structure of modifiers. *Linguistic Inquiry* 14(4). 695–697.

Bach, Emmon. 1986. The algebra of events. *Linguistics and Philosophy* 9(1). 5–16.

Beavers, John. 2011. On affectedness. *Natural Language & Linguistic Theory* 29(2). 335–370. https://doi.org/10.1007/s11049-011-9124-6.

Borer, Hagit. 2005a. *Structuring sense volume I: In name only*. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199263905.001.0001.

Borer, Hagit. 2005b. *Structuring sense volume II: The normal course of events*. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199263929.001.0001.

Burzio, Luigi. 1986. *Italian syntax*. Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-94-009-4522-7.

Carlson, Greg N. 1984. Thematic roles and their role in semantic interpretation. *Linguistics* 22(3). 259–280. https://doi.org/10.1515/ling.1984.22.3.259.

Chao, Yuen Ren. 1968. *A grammar of spoken Chinese*. Berkeley, CA: University of California Press.

Chomsky, Noam. 1995. *The minimalist program*. Cambridge, MA: MIT Press.

Cinque, Guglielmo. 1999. *Adverbs and functional heads: A cross-linguistic perspective*. New York: Oxford University Press.
Cusic, David Dowell. 1981. *Verbal plurality and aspect*. Stanford, CA: Stanford dissertation.
Deng, Dun. 2013. *The syntax and semantics of event quantifiers in Mandarin Chinese*. Madison, WI: University of Wisconsin dissertation.
Donazzan, Marta. 2013. On counting and measuring events. In Emmanuel Chemla, Vincent Homer & Grégoire Winterstein (eds.), *Proceedings of Sinn und Bedeutung 17*, 219–236.
Dowty, David. 1991. Thematic proto-roles and argument selection. *Language* 67(3). 547–619. https://doi.org/10.2307/415037.
Fang, Mei. 2022. Cong fuci duyong xianxiang kan weizhi mingan yu yiyi fuxian [Positional sensitivity and the emergence of meaning: A study on freestanding adverbs in Chinese conversation]. *Zhongguo Yuwen [Studies of the Chinese Language]* 1. 3–15.
Filip, Hana. 2008. Events and maximalization: The case of telicity and perfectivity. In Susan Rothstein (ed.), *Theoretical and crosslinguistic approaches to the semantics of aspect*, 217–256. Amsterdam: John Benjamins. https://doi.org/10.1075/la.110.10fil.
Filip, Hana & Susan Rothstein. 2005. Telicity as a semantic parameter. In James Eric Lavine, Steven Franks, Hana Filip & Mila Tasseva-Kurktchieva (eds.), *Formal approaches to Slavic linguistics 14: The Princeton meeting*, 139–156. Ann Arbor: Michigan Slavic Publications.
Garey, Howard B. 1957. Verbal aspect in French. *Language* 33(2). 91–110. https://doi.org/10.2307/410722.
Gu, Qianping. 2022. Telicization in Mandarin Chinese. *Journal of Linguistics* 59(3). 1–33. https://doi.org/10.1017/S0022226722000111.
Guo, Yiyang & Shumian Ye. 2023. Syntax and semantics of the verbal classifier *bian* in Mandarin Chinese. *Proceedings of the Seoul International Conference on Generative Grammar* 25. 40–49.
Huang, C.-T. James. 2008. Cong ta de laoshi dang de hao tanqi [On ta de laoshi dang-de hao and related problems]. *Yuyan Kexue [Language Sciences]* (03). 225–241.
Huang, C.-T. James, Y.-H. Audrey Li & Yafei Li. 2009. *The syntax of Chinese*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781139166935.
Krifka, Manfred. 1989. Nominal reference, temporal constitution and quantification in event semantics. In Renate Bartsch, Johan van Benthem & Peter van Emde Boas (eds.), *Semantics and contextual expression*, 75–115. Dordrecht: Foris Publications. https://doi.org/10.1515/9783110877335-005.
Krifka, Manfred. 1992. Thematic relations as links between nominal reference and temporal constitution. In Ivan A. Sag & Anna Szabolcsi (eds.), *Lexical matters*, 29–53. Stanford: CSLI Publications.
Krifka, Manfred. 1998. The origins of telicity. In Susan Rothstein (ed.), *Events and Grammar* (Studies in Linguistics and Philosophy), 197–235. Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-94-011-3969-4_9.
Landman, Fred. 1989a. Groups, I. *Linguistics and Philosophy* 12(5). 559–605. https://doi.org/10.1007/BF00627774.
Landman, Fred. 1989b. Groups, II. *Linguistics and Philosophy* 12(6). 723–744. https://doi.org/10.1007/BF00632603.
Landman, Fred. 2000. *Events and plurality*. Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-94-011-4359-2.

Landman, Fred. 2004. *Indefinites and the type of sets*. Oxford: Blackwell Publishing. https://doi.org/10.1002/9780470759318.ch10.
Landman, Fred. 2006. Indefinite time-phrases, in situ-scope, and dual-perspective intensionality. In Svetlana Vogeleer & Liliane Tasmowski (eds.), *Non-definiteness and plurality*, 237–266. Amsterdam: John Benjamins.
Larson, Richard K. 2004. Sentence final adverbs and "scope". *Proceedings of NELS* 34. 23–43.
Link, Godehard. 1983. The logical analysis of plurals and mass terms: A lattice-theoretical approach. In Rainer Bäuerle, Christoph Schwarze & Arnim von Stechow (eds.), *Meaning, use and interpretation of language*, 303–323. Berlin: Walter de Gruyter.
Link, Godehard. 1984. Hydras. On the logic of relative clause constructions with multiple heads. In Fred Landman & Frank Veltman (eds.), *Proceedings of the fourth Amsterdam Colloquium*, 245–257. Dordrecht: Foris Publications.
Link, Godehard. 1987. Generalized quantifiers and plurals. In Peter Gärdenfors (ed.), *Generalized quantifiers: Linguistic and logical approaches* (Studies in Linguistics and Philosophy), 151–180. Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-94-009-3381-1_6.
Liu, Shiru. 1959. Hanyu donglaingci de qiyuan [Origin of Chinese verbal classifiers]. *Zhongguo Yuwen [Studies of the Chinese Language]* (6). 263–264.
Martínez Vera, Gabriel. 2021. Degree achievements and maximalization: A cross-linguistic perspective. *Glossa: A Journal of General Linguistics* 6(1). https://doi.org/10.16995/glossa.5883.
Parsons, Terence. 1990. *Events in the semantics of English*. Cambridge, MA: MIT Press.
Perlmutter, David M. 1978. Impersonal passives and the Unaccusative Hypothesis. *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* 4. 157–190. https://doi.org/10.3765/bls.v4i0.2198.
Wagiel, Marcin. 2024. Acts, occasions and multiplicatives: A mereotopological account. *Semantics and Linguistic Theory (SALT)* 33. 276–297. https://doi.org/10.3765/a5wn4f77.
Ye, Shumian & Yiyang Guo. 2023. Pluractionality via competition: VV in Mandarin Chinese. *Proceedings of Sinn und Bedeutung* 27. 729–747. https://doi.org/10.18148/sub/2023.v27.1096.
Zhang, Niina Ning. 2017. The syntax of event-internal and event-external verbal classifiers. *Studia Linguistica* 71(3). 266–300. https://doi.org/10.1111/stul.12073.
Zucchi, Sandro & Michael White. 2001. Twigs, sequences and the temporal constitution of predicates. *Linguistics and Philosophy* 24(2). 223–270. https://doi.org/10.1023/A:1005690022190.